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VII. *An Account by David Hartley, M. B. F. R. S. of Dr. Trew's Dissertation concerning the Differences of a Human Body before and after Birth, intituled, Diff. epistolica de differentiis quibusdam inter hominem natum & nascendum intervenientibus, deque vestigiis Divini Numinis inde colligendis. Jo. Georgio Kramero inscripta. Cum Tab. Æn Autore Christoph. Jacobo Trew, Noribergiae, 1736. 4<sup>to</sup>.*

THERE are, according to Dr. *Trew*, Two remarkable Observations, which Animal Bodies suggest, 1<sup>st</sup>, That the same general Ends are accomplished in different Animals by all the possible Varieties of Means. 2<sup>dly</sup>, That Animal Bodies are Machines, which produce in themselves all those Changes, that are necessary for their Preservation and Well-being. Thus the same general Ends of Chylification, Circulation, Secretion of Bile, &c. are accomplished in different Animals by Organs that differ considerably from each other; and in the same Animal the Body of the *Fœtus* is very different in its Structure from that of the Adult, at the same time that this Difference is effected by the Body itself, each subsequent Variation, the natural and mechanical Consequence of that which immediately preceded, and the Whole conducted in the best possible manner for the Welfare and Happiness of the Animal.

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The Author's Design in this Dissertation is to consider those Differences of a Human Body before and after Birth, which affect the Circulation of the Blood. And for this Purpose he has given us 78 very curious and accurate Figures of the Parts relating thereto, such as the Heart, and Trunks of the great Blood-vessels, the Liver, the *Vena Portarum*, the Umbilical Chord, &c. subjoining to them a very minute and precise Explanation of each. Some of these Figures represent the Parts as they appeared immediately upon Dissection, others as inflated and dried, others again as injected with Wax; and lastly, others as having been first injected, and well dried, then cleared of the Injection, and laid open, in order to shew the several Cavities and Valves in their natural Dimensions and Positions. This last Method he prefers to all the rest, and observes, with relation to it, that the Injection must not be thrown in too hot, and that the internal Parts of the Preparation must be perfectly dry before we attempt to evacuate it; inasmuch as a Neglect of either of these Cautions would make the Valves, and their Membranes, shrivel up and contract themselves from their natural Sizes and Positions. The Manner of doing it is to suspend the Preparation in a proper Vessel placed in a gentle Heat, having first made an Aperture in the most depending Part, for the Injection to run out at.

From these Figures, with their Explanations, our Author draws the following Anatomical and Physiological Conclusions.

1<sup>st</sup>, That, contrary to *Casseri*'s Figure, the Umbilical Vein enters the Liver towards the Left Part of it.

2dly, That the Sulcus of the Liver, through which the Umbilical Vein passes, is not always the same. In some Subjects it surrounds the Vein along its whole Passage, in others only in Part of its Passage, and in others it is an imperfect Chancel, which merely receives the Vein.

3dly, There is but one Umbilical Vein, it empties itself into the Left Extremity of the *Sinus Venæ Portarum*, and sends no Branches to the Liver.

4thly, The Communication between the Umbilical Vein, and the *Sinus Venæ Portarum*, is so free, that the Blood has no Obstacle in passing either Way. Our Author asks therefore, What is the Cause of the Blood's Motion from the Umbilical Vein into the Liver, and whether the Pulsation of the Umbilical Arteries be one sufficient to produce this Effect?

5thly, The *Venæ Portarum* sends no Branches to the Liver, but opens into a particular *Sinus*, called *Sinus Venæ Portarum*; and this Opening is nearer to the Right Extremity of the *Sinus* than to the Left.

6thly, The Diameter of the *Venæ Portarum* is much less than that of the Umbilical Vein. The Diameter of the Left Part of the *Sinus Venæ Portarum* is generally larger than both these together, never much less than that of the Umbilical Vein; and the Diameter of the *Canalis Venosus* is least of all. The Blood therefore of the *Venæ Portarum* mixes with that of the Umbilical Vein in the *Sinus*. And since the Blood of the Umbilical Vein, which abounds with chylous Particles, does thus mix with that of the *Venæ Portarum* in the *Fœtus*, it may be asked, Whether in Adults the Branches of the *Venæ Portarum*, which arise from the Stomach and Intestines,

testines, do not suck up some chylous Parts from the Aliment? And whether both in the *Fœtus*, and in the Adult, Chyle be not a necessary Ingredient in the Composition of Bile? It is certain, that the Chyle passes into the *Vena Portarum* in Birds.

7thly, The *Canalis Venosus* empties itself into the *Cava Inferior*, where the Three Veins arising from the Liver empty themselves.

8thly, The *Valves* which are placed at the Two Extremities of the *Canalis Venosus*, facilitate the Ascent of the Blood in it, and also contribute to close it after Birth.

9thly, The *Valve* of the Coronary Vein is nothing else but its external Coat, something elongated within the Cavity of the Right *Auricle*; and its Use is to close the Orifice of this Vein when the *Auricle* is distended with Blood, just as the nervous Coat of the Bladder closes the Orifices of the Ureters when the Bladder is distended with Urine.

10thly, *Eustachius's Valve* is found both in the *Fœtus*, and in the Adult; and its Use seems to be, to direct the Blood's Motion variously, according to the various Circumstances of the Right *Auricle*, during its *Diastole* and *Systole*; and principally to hinder the Regress of the Blood into the *Cava Inferior*, when the *Auricle* is contracted.

11thly, The Use of the *Foramen Ovale*, and *Canalis Arteriosus*, seems to be, to intercept Part of the venal Blood, and transmit it to the Left *Auricle* and *Aorta*, that so the Whole be not forced upon the Lungs during their State of Inactivity in the *Fœtus*; of the Membrane, which is placed before the *Foramen Ovale*, to direct the Communication of the  
*Auricles*

*Auricles* before Birth, and prevent it afterwards; and lastly, of the valvulous Productions at the Two Extremities of the *Canalis Arteriosus*, in like manner to direct the Blood in its Motion through this Canal before Birth, and to exclude it afterwards. Here our Author enters into a very minute Examination of Monsieur *Mery's* Hypothesis, but does not agree to it; affirming, that the Membrane of the *Foramen Ovale* is so placed as to permit the Blood to pass freely from the Right *Auricle* to the Left, during the *Diastole* of the *Auricles*, but never from the Left *Auricle* to the Right.

12thly, The Use of the *Urachus* in the human *Fœtus* is not yet discovered. Our Author here supposes, according to the Determination of the best Anatomists, that the human *Fœtus* has no *Allantois*.

13thly, The Situation of the Stomach in the *Fœtus* is such, as makes up for the want of Action in the *Diaphragm*, as far as relates to Digestion. For as in the Adult, the Action of the *Diaphragm* facilitates the Descent of the Aliment, so in the *Fœtus* the *Cardia* is made to rise above the *Pylorus* more than in the Adult, from its Connexion with the *Diaphragm*, for the same Purpose.

14thly, The Smallness of the Stomach in new-born Children shews, that it ought not to be oppressed either with much Aliment at once, or with such as is gross.

15thly, The Descent of the *Testicles* into the *Scrotum* does not always happen at the same time.

16thly, The recurrent Nerve seems to be some way subservient to the *Canalis Arteriosus*. This our Author conjectures from its passing round the *Aorta*  
just

just where this receives the *Canalis Arteriosus*; but observes, that the Knowledge of the Use and Action of the Nervous System is much more imperfect than any other Branch of the Animal Oeconomy.

*There is a short Dissertation (with Four Figures of the Tongue, its Vessels, Glands, Muscles, and Nerves annexed) by the same Author; whose principal Intent is to shew, that the Vessels called salival Ducts by Coschwitzius, are not salival Ducts, but Veins.*

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VIII. *Some curious Experiments and Observations on a Beetle, that lived Three Years without Food: Communicated to the ROYAL SOCIETY in a Letter from Mr. Henry Baker to Alexander Stuart, M. D. F. R. S.*

S I R,

WHEN I had the Honour of waiting on you lately, and was mentioning, in Conversation, the uncommon and surprising Strength of Life bestowed by Providence on a certain *English* Insect, called by *Petiver*, *Scarabæus impennis tardipes*, the slow-legged Beetle. *Moff.* 139. *Fig. id. Angl.* 999. *Gaz.* Decad. 3<sup>e</sup>, Tab. xxiv. 7. (whose Natural History, as to that Particular, has never, I believe, been touched on) you was pleased to think it so extraordinary, as to desire I would write down the Observations I had made, since the Accidents that led me into them may perhaps never again occur: And you seemed of Opinion, that their being known may